MEMPHIS ARCHAEOLOGICAL AND GEOLOGICAL SOCIETY

MAGS Rockhound News

Volume 66 ◊ Number 08 ◊ August 2020 ◊ A monthly newsletter for and by the members of MAGS

MAGS Update

W. C. McDaniel, MAGS President

We have entered our fifth month of cancelled events and restrictions due to the Covid 19 virus. It remains uncertain as what the near future will bring. However, MAGS is looking ahead and here is an update.

1. Currently Memphis/Shelby County is in Phase 2 and due to the continued uptick in cases have delayed moving into Phase 3.
2. The next two Membership meetings would normally be scheduled for August 14 and *Continued, P. 3*

In this issue

VOTE FOR YOUR FAVORITES

The entries are in! Photos entered in the MAGS Field Trip Finds contest are posted on pages 4–6. The decision is up to you.

You will choose the winning photos. Vote for up to three pictures, by giving the numbers of your choices. The photo numbers are only for identification; the pictures are in random order.

Look over the pictures and vote by sending your choices to lybanon@earthlink.net, with"Photo Contest Votes" in the subject line. Vote for up to three photos and identify your choices by photo numbers.

All photos were submitted by the entrants. They want your votes.

2019-2020 MAGS BOARD

President–W. C. McDaniel
(901) 274-7706 ◊ w.c.mcd@att.net

1st VP (Field Trips)– Charles Hill
(901) 626-4232 ◊ hunter3006@aol.com

2nd VP (Adult Programs)–Dave Clarke
(901) 308-0334 ◊ dclarke@fieldmuseum.org

Secretary–Mike Coulson
(901) 907-9441 ◊ mike.coulson@comcast.net

Treasurer–Bonnie Cooper
(901) 444-0967 ◊ rocks4us@hotmail.com

Director (Asst. Field Trips)– Open

Director (Asst. Adult Prog.)–Matthew Lybanon
(901) 757-2144 ◊ lybanon@earthlink.net

Director (Youth Programs)–Mike Baldwin
(901) 853-3603 ◊ mbaldwin05@gmail.com

Director (Asst. Youth Prog.)–James Butchko
(901) 743-0058 ◊ butch513j@yahoo.com

Director (Librarian)–Nannett McDougal-Dykes
(901) 634-9388 ◊ redchesty@yahoo.com

Director (Asst. Librarian)—Kay MacLaughlin
(901) 465-6343 ◊ celticcatssilver@att.net

Director (Membership Services)–Bob Cooper
(901) 444-0967 ◊ rocks4us@hotmail.com

Director (Historian)–Jane Coop
(901) 685-8103 ◊ dogsandrocks3@gmail.com

Newsletter Editor–Matthew Lybanon
(901) 757-2144 ◊ lybanon@earthlink.net

Assistant Newsletter Editor–Carol Lybanon
(901) 757-2144 ◊ sgcarol@earthlink.net

Webmaster–Mike Baldwin
(901) 853-3603 ◊ mbaldwin05@gmail.com

Assistant Webmaster–Mike Coulson
(901) 907-9441 ◊ mike.coulson@comcast.net

Show Chairman–James Butchko
(901) 743-0058 ◊ butch513j@yahoo.com

Past President–Charles Hill
(901) 626-4232 ◊ hunter3006@aol.com

MAGS AND FEDERATION NOTES

Memphis Archaeological and Geological Society, Memphis, Tennessee

The objectives of this society shall be as set out in the Charter of Incorporation issued by the State of Tennessee on September 29, 1958, as follows: for the purpose of promoting an active interest in the geological finds and data by scientific methods; to offer possible assistance to any archaeologist or geologist in the general area covered by the work and purposes of this society; to discourage commercialization of archaeology and work to its elimination and to assist in the younger members of the society; to publicize and create further public interest in the archaeological and geological field in the general area of the Mid-South and conduct means of displaying, publishing and conducting public forums for scientific and educational purposes.

MAGS General Membership Meetings and MAGS Youth Meetings are held at 7:00 P. M. on the second Friday of every month, year round. The meetings are held in the Fellowship Hall of Shady Grove Presbyterian Church, 5530 Shady Grove Road, Memphis, Tennessee.

MAGS Website: memphisgeology.org

MAGS Show Website: www.theearthwideopen.com or https://earthwideopen.wixsite.com/rocks

We aren't kidding when we say this is a newsletter for and by the members of MAGS. An article with a byline was written by a MAGS Member, unless explicitly stated otherwise. If there is no byline, the article was written or compiled by the Editor. Please contribute articles or pictures on any subject of interest to rockhounds. If it interests you it probably interests others. The 15th of the month is the deadline for next month's issue. Send material to lybanon@earthlink.net.

The August DMC Field Trip has been cancelled. Clubs scheduled to host for the remainder of this year, from July through December, have the option to preemptively reschedule to 2021.

Links to Federation News

- AFMS: www.amfed.org/afms_news.htm
- SFMS: www.amfed.org/sfms/
- DMC: www.amfed.org/sfms/_dmc/dmc.htm

MAGS Update
Continued from P. 1

September 11.

3. **The August 14 Membership Meeting is cancelled.**
4. **Field trip**—Charles has scheduled a field trip for Saturday, August 15. As usual we will not publish field trip details and will distribute to Members upon request. The trip will be to Crow Creek with a new site and access point. Members only.
5. MAGS will not schedule a Membership Meeting until we are in Phase 3. However, when a meeting is scheduled I will update you as to the date and format-It will be different.

Erratum

***Editor**: Sorry about the mistake, but I've always wanted to use that word.*

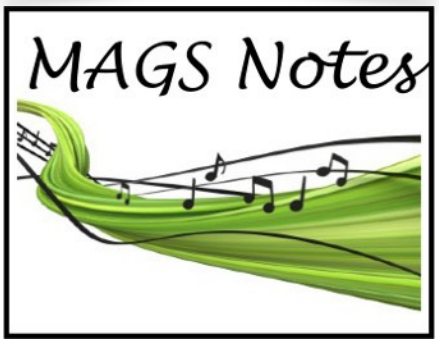
The picture shown in "Ancient Clam Shell" in last month's issue (P. 9) is the wrong clam. Here is the right one.

Torreites sanchezi is described as looking like tall pint glasses with lids shaped like bear claw pastries. The photo above shows what they looked like.

Clement Museum Show

Tina Walker,Director
Ben E. Clement Mineral Museum
Marion, Kentucky

The Ben E. Clement Mineral Gem, Mineral, Fossil, and Jewelry show has been postponed until October 10 & 11, 2020 (***Editor's Note**: This was announced in our May issue.*). This is contingent upon Covid-19. If you are interested in coming to the show please call the museum (270-965-4263) to make sure we are still having it.



The lead article on P. 1 has the latest on plans for resuming MAGS events. The full *MAGS Notes* will be resumed when the events are resumed.

🎵 Field Trips

August 15: Crow Creek, new site and access point. Members only. Contact Charles Hill (see P. 2) for info.

🎵 August Birthdays

3	Mike Coulson
	Jane Brandon
5	Cate Cloer
12	Ron Brister
	David Murray
13	George Krasle
14	Rommel Childress
16	George Loud
	Letitia Brister
17	Sophia Coulson
	Christine Lemons
19	Heidi Kitkowski
23	Stephanie Blandin
25	Lenora Murray
28	Beth Day
	Susan Cohn

Jewelry Bench Tips by *Brad Smith*

STRAIGHTENING WIRE

Have you ever pulled out some silver wire only to find that it's all bent up? The easiest way I've found to straighten it out is to stretch it a bit.

Simply put one end in the vise and grab the other end with a pair of serrated tip pliers. Then pull just enough to feel the wire stretch like a rubber band. This works best on smaller wire diameters, up to about 16 ga.

Be careful if you are trying to pull hard on a thick wire. Brace yourself in case the wire breaks or pulls out of the pliers.

DO BEZELS SHRINK?

The engineer in me says there's no reason a bezel should shrink when I solder it onto a base plate, but I sometimes find that the stone won't quite fit into the bezel that was perfect just before soldering.

Continued, P. 8

The Great MAGS Field Trip Finds Photo Contest

Vote for up to three of these pictures by sending the number(s) of your choice(s) to lybanon@earthlink.net, with "Photo Contest Votes" in the subject line.

1. Ammonites, Lake Texoma, Oklahoma

2. Quartz Cluster, Wegner Mine, Mt. Ida, Arkansas

3. Ammonite, Cooke County, Texas

4. Pink Dolomite with Chalcopyrite and Calcite, Vulcan Quarry, Black Rock, Arkansas

5. Wavellite, Mt. Ida, Arkansas

6. Double nail head twin Calcite crystal, Batesville, Arkansas

Continued, P. 5

Continued from P. 4

The Great MAGS Field Trip Finds Photo Contest

Don't forget to vote.

7. Natural Horse Creek Chert, Nonconnah Creek, Memphis, Tennessee

8. Trilobites, Vulcan Quarry, Parsons, Tennessee

9. Agate Rock, Nonconnah Creek, Memphis, Tennessee

10. Barite, Potosi Area, Missouri

11. Ammonites, Cooke County, Texas

12. Limestone Shattercone , Wells Creek Comet Impact Crater, Tennessee

13. Pine Cone, Union Chapel Mine, Jasper, Alabama

Continued, P. 6

Continued from P. 5

The Great MAGS Field Trip Finds Photo Contest

Vote for up to three of these pictures.

14. Druzy Quartz, Potosi Area, Missouri

15. Petrified Wood, Memphis Stone & Gravel Co., Mississippi

Fabulous Tennessee Fossils

Dr. Michael A. Gibson,
University of Tennessee at Martin

FTF 67

Copper Ridge Stromatolites

In this essay, I would like to introduce you to a group of fossils that do not fit the typical body fossil, trace fossil, molecular fossil categories. Stromatolites are not fossils like we normally think of them. The prefix "strom-" means "mound", referring to their typical shape. Stromatolites are "biogenically-laminated sedimentary structures" formed by the trapping, binding, and cementation of sediments by microscopic cyanobacteria or microbial communities. Because the cyanobacteria are microscopic, we usually cannot see them, except with a high-power microscope. Instead we see what the cyanobacteria do to the sediment in their immediate environment on the seafloor, which is to bind sediments with their sticky mucus sheaths to produce a rhythmic repetition of sedimentary layers that for a shape for the entire mass. Shapes can range from thin mats to bumpy surfaces to build-ups growing up from the seafloor that can resemble reefs in their structure and size.

Stromatolites represent one of the earliest life forms on earth, which dominated the biosphere from ~ 3.5 billion years to 500 million years ago (Proterozoic Eon), and these microbial communities were responsible for the shift on Earth from a CO_2-dominated atmosphere to one dominated by oxygen and nitrogen. With the onset of the current Phanerozoic Eon" cyanobacteria became food for newly evolving organisms and the world's environments were becoming less extreme, so their dominance dwindled; however, they are still very much alive and found globally. You most likely see them as the scum on tide pools along the beaches or perhaps the most famous Shark Bay, Australia, stromatolites. I had the great fortune to be one of the discoverers of the largest freshwater stromatolite field in the Western Hemisphere, the Bacalar, Mexico Stromatolite Field. Their dominance in Earth's early evolving biosphere has resulted in a significant amount of interest

Continued, P. 7

Fabulous Tennessee Fossils Continued from P. 6

by NASA's exobiology program of stromatolites and possible analogs on other planets.

As part a Center of Excellence for Science and Mathematics Education project for teachers, I found an extensive stromatolite field within the Copper Ridge Dolomite (Upper Cambrian), in Grainger County, Tennessee, along the northwestern shoreline of Cherokee Lake while field checking a teacher's geological research site in 1990. The discovery was possible because the lake levels were at their lowest due to a drought during that time period. This discovery was significant in that the Copper Ridge stromatolites were essentially undocumented in spite of their abundance and unusual preservation features described below. Interestingly, the Copper Ridge stromatolite locality occurs stratigraphically near the critical global decline of stromatolite dominance of the biosphere (~500 million years ago) which corresponds to the rise of multi-cellular life in the early Phanerozoic.

Along with Dr. Stan Dunagan, our UT Martin sedimentologist, and about 15 of our geology majors, we conducted field trips to the site a few years ago when the lake level had again dropped. We located over 100 distinct stromatolites, many in clusters, just east of the Turney Mill Plantation development in an undetermined thickness of the Copper Ridge Dolostone. We understood the task of measuring individual stromatolites heads, which vary in size from an orange to a beach ball and mapped the field location of each cluster. Later, we cut nearly 50 of the stromatolites and polished their surfaces so we could study their internal features. From that lot, 25 were selected for further cutting so that we could make microscope slides of the internal features to study them at that scale.

First, all of the stromatolites have been replaced with silica to become chertified. This explains the excellent preservation of fine detail in the laminations This is not uncommon for Proterozoic stromatolites. Another very interesting phenomenon we observed is that the preserved external form of the stromatolites may not always correlate with the internal growth form of the stromatolites. External forms include "balls," "domes," "coconuts," "stacked mounds," and "pillars". Secondary surface shapes and patterns produced by stromatolitic laminations include "bilete," "trilete," "tetralete," "pentalete," (meaning they have 2, 3, 4, or 5 grooves or depressions within the mound that makes them appear hollowed-out), "mammilate," "multimammilate," "birdsnest," "digitate," and "simple mounds". Clearly there was a wide diversity of possible growth patterns and some of the surface patterns represented repeated stromatolitic lamination growth phase truncated by phases of sediment infilling to partial smother the mat, to only have it re-establish itself.

Most fossil and modern stromatolites grow from the seafloor upwards and outwards from a central region, giving the internal structure a laminated texture that shows an outward radiating pattern; however, while that pattern does occur in the Copper Ridge stromatolites, many of the mounds show a very different pattern that involves the "-letes" mentioned above. The outer surfaces (laminae) of these stromatolites are trunctated suggesting erosion. Additionally, some of our mounds look like one half of the preserved mound belonged to a different original stromatolite mound over 500 million year ago. Somewhere along the way, groundwater worked on the internal features of the stromatolites and changed their ability to survive erosion.

In many, however, interior laminae are dominated by smoothly arcing microbial laminations radiating away from the center, but preserving an infilled hollow region (the "-letes). The infill between the stromatolites includes lamina and thin beds of ooid grainstone and ripped-up pieces of seafloor, typical carbonate seafloor sediments. The origin and mechanism which produces this particular external form and secondary surface patterns remains enigmatic; however, it is possible that this pattern is not due to the actual growth of the stromatolites, but to later chert replacement patterns after burial followed by subsequent erosion processes millions of years later. Modern stromatolites do not show a central depression.

You will not need to travel to Cherokee Lake to see these oddities of the Cambrian world. We are using some of the actual Copper Ridge stromatolites collected and used in this study to re-create a stromatolite field

Continued, P. 8

Fabulous Tennessee Fossils *Continued from P. 7*

at the UT-Coon Creek Science Center, complete with sculpted seafloor. This outdoor display will be the first of many displays that depict some of the fossil deposits from around Tennessee and from other time periods in geologic time. The Covid-19 pandemic is still delaying opening of the new facility; however, we are completing many upgrades to the site in anticipation of having visitors in the near future.

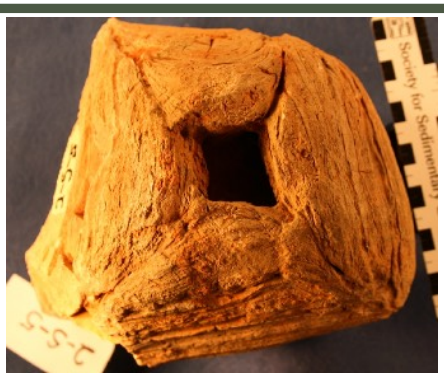


Figure 1. Top-view of a stromatolite replaced by chert. Note the "-lete" opening in the center and the laminations. This specimen demonstrates the atypical growth and preservation pattern of many Copper Ridge stromatolites (photo by MAG; scale in millimeters).

Figure 2. Copper Ridge stromatolite cut and polished to review internal laminations and features (photo by MAG; scale in millimeters).

Jewelry Bench Tips *Continued from P. 3*

If that ever happens to you, here's a fix that usually works for those times when there's just a minor problem. I file or sand the stone down a little around its base. For soft cabs like turquoise, lapis, jet or Howelite, you can use a sanding stick. Harder cabs like jasper or agates will require a diamond file. In a pinch, a ruby nail file from the drugstore will work.

There are two important things to remember when doing this. First, you can only make a minor adjustment to the stone's size. All filing or sanding has to be hidden by the bezel because it takes the polish off the stone.

Secondly, remember to round off all sharp edges on the bottom of the stone. A sharp edge here might sit on a little extra solder that's in the bottom joint of your bezel. Just a little bump here can put enough stress the stone to risk breakage when you burnish the bezel down over the stone.

Learn New Jewelry Tricks and Techniques in Brad's Jewelry-Making Books

amazon.com/author/bradfordsmith

How Old Is It?

Matthew Lybanon

This article is a bit longer than most articles in *MAGS Rockhound News*, but the justification (OK, excuse) is an Albert Einstein quotation: "Everything should be made as simple as possible, but not simpler."

In 1946, University of Chicago Chemistry professor Willard Libby proposed an innovative method for dating organic materials by measuring their content of carbon-14 (^{14}C), a newly discovered radioactive isotope of carbon. Known as radiocarbon dating, this method provides objective age estimates for carbon-based objects that originated from living organisms. The "radiocarbon revolution" made possible by Libby's discovery greatly benefitted the fields of archaeology and geology by allowing practitioners to develop more precise historical chronologies across geography and cultures.

Here's the science. The ^{14}C nucleus contains 6 protons and 8 neutrons, as opposed to the 6 and 6 found in ordinary ^{12}C. ^{14}C is unstable, with a half-life of about 5,700 years, and is a beta particle emitter. The ^{14}C found in nature is constantly being regenerated by cosmic rays hitting the atmosphere. The radioactive atom is absorbed by plants and living matter in the same way as its non-radioactive isotope, and the ratio of the two isotopes is known. When a living organism dies, the radioactive carbon is no longer absorbed, and the fraction of ^{14}C begins to decrease. This is key to how radiocarbon dating works.

Radioactive decay occurs in

Continued, P. 9

How Old Is It? *Continued from P. 8*

unstable atomic nuclei—those that don't have enough binding energy to hold the nucleus together. It comes in three main types, named alpha, beta, and gamma for the first three letters of the Greek alphabet. Three types of detectors are most commonly used to detect the radiation from radioactive decay: gas-filled detectors, scintillators, and solid state detectors.The Geiger Counter (or Geiger-Mueller Counter) is an example of a gas-filled detector.

Here's the math. The probability per unit time that a radioactive atom will disintegrate is constant. An atom is just as likely to disintegrate at one time as another. You can't predict when a particular atom will disintegrate, but you know that in some time interval a certain fraction of the atoms will disintegrate.

So when there are lots of radioactive atoms, a (relatively) large number of them will disintegrate. And when there are fewer atoms (because many of them have already decayed) a smaller number will disintegrate. More precisely, the rate of decay is proportional to the number of unstable atoms present.

The calculus student will immediately recognize this situation: exponential decay (yes, "exponentially" can mean a decrease, not just growth). And if you missed that class it still isn't hard to see how it works. More radioactive atoms around means there are more to decay. When lots of them are present the decay is rapid, and later, after some of them have disintegrated and there are fewer left, the decay rate slows down (Figure 1).

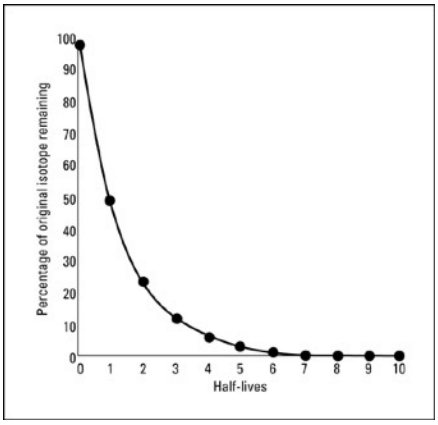


Figure 1. Exponential Decay

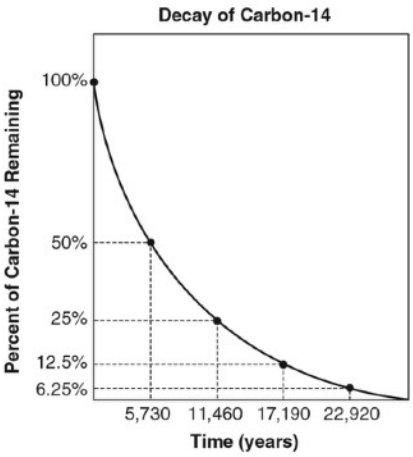


Figure 2. ^{14}C Decay Showing Half-Lives

After some time interval, half of the original atoms are present. This time period is called the radioactive element's **half-life**. After the second half-life, half of the atoms remaining after the first half-life are left. And so on: after one half-life half of the original number of atoms are left, after two half-lives one-fourth of the original number, one-eighth after three half-lives, ... (Figure 2). After several half-lives the number of radioactive atoms has decreased a lot, the decay rate is much less, and eventually the radiation is below the detection threshold of your detector.

Finally ... how it works. It's just a matter of putting together the pieces described above. As soon as a living organism dies, it stops taking in new carbon. The ratio of ^{12}C to ^{14}C at the moment of death is the same as every other living thing, but the ^{14}C decays and is not replaced, while the amount of ^{12}C remains constant in the sample. By looking at the ratio of ^{12}C to ^{14}C and comparing it to the ratio in a living organism, it is possible to determine the age of a formerly living thing fairly precisely.

When Libby first presented radiocarbon dating to the public, he estimated that the method may have been able to measure ages up to 20,000 years. With subsequent advances in the technology of ^{14}C detection, the method can now reliably date materials as old as 50,000 years. That's about 8-9 half-lives. So radiocarbon dating can be used to find the ages of samples from theHolocene or late Pleistocene epochs. Other methods (see below) are *Continued, P. 10*

How Old Is It? *Continued from P. 9*

used to date older samples.

Radiocarbon dating would be most successful if it was true that the concentration of ^{14}C in the atmosphere had been constant for thousands of years, and that ^{14}C moved readily through the atmosphere, biosphere, oceans and other reservoirs—a process known as the carbon cycle. In the absence of any historical data about the intensity of cosmic radiation, Libby assumed that it had been constant.

Later work showed that this assumption isn't strictly true. Calibration of radiocarbon results accounts for changes in the atmospheric concentration of ^{14}C over time, changes that were brought about by several factors. The most popular and often used method for calibration is dendrochronology.

The science of dendrochronology is based on the phenomenon that trees usually grow by the addition of rings. Dendrochronologists date events and variations in environments in the past by analyzing and comparing growth ring patterns of trees and aged wood. They can determine the exact calendar year each tree ring was formed. Dendrochronological findings played an important role in the early days of radiocarbon dating.

Instead of devoting more of this article to calibration, I'll just say that experts believe that dates found from calibrated radiocarbon dating are accurate and reliable.

What about specimens older than 50,000 years? Geologists and paleontologists are interested in rocks and fossils millions or even billions of years old. Stratigraphy can determine relative dates, but other methods are needed to attach numbers to the relative dates.

One of these other methods is based on the same idea as radiocarbon dating, using radioactive materials with much longer half-lives. There may also be some small differences in the analysis, but the basic idea is the same: the proportion of an unstable radioactive element is reduced. Uranium–lead dating is one of the oldest and most refined of the radiometric dating schemes. It can be used to date rocks that formed and crystallized from about 1 million years to over 4.5 billion years ago with routine precisions in the 0.1–1 percent range. The method relies on two separate decay chains, the uranium series from ^{238}U to ^{206}Pb, with a half-life of 4.47 billion years and the actinium series from ^{235}U to ^{207}Pb, with a half-life of 710 million years.

How Does Radiometric Dating Work? 2 videos: https://www.youtube.com/watch?v=oe45GegJUvM AND https://www.youtube.com/watch?v=I4AZb-X_cZI0

Want more details? Google is your friend. A recent article in *Rock&Gem* mentions that a study used a combination of uranium-lead dating of sediments and other methods to date ancient bones.

***Ref**: Jim Brace-Thompson, Earth Science In the News: Rock Record and Ancestry, Rock&Gem, July 16, 2020, https://www.rockngem.com/earth-science-in-the-news-rock-record-and-ancestry/*

Web Tip

https://www.nature.com/articles/d41586-020-02190-y

Archaeologists excavating a cave in the mountains of central Mexico have unearthed evidence that people occupied the area more than 30,000 years ago, which suggests that humans arrived in North America at least 15,000 years earlier than thought. The researchers found almost 2,000 stone tools, 239 of which were embedded in layers of gravel that have been **carbon dated** (see "How Old Is It," above) to between 25,000 and 32,000 years old.

Ancient Life, Revived

Matthew Lybanon, Editor

Is it "Jurassic Park" or is it "Little Shop of Horrors"? Neither, we hope. But a team of scientists say that they've revived a plant from the Pleistocene era.

In 2012 a team of scientists claimed that they revived a plant that lived 32,000 to 28,000 years ago. *Silene stenophylla* was revived after it had been ingested by an arctic ground squirrel roughly 32,000 years ago. The seeds were regenerated into full flowering plants in Russia.

Radiocarbon dating has confirmed that the seeds date from 31,800 years ago.

The discovery of *Continued, P. 11*

Ancient Life, Revived Continued from P. 10

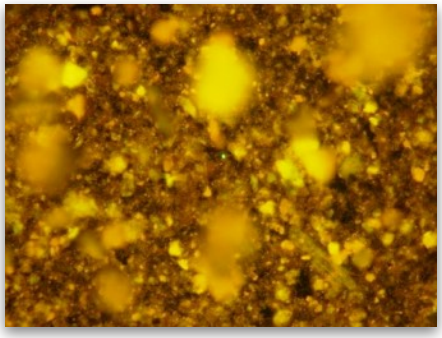
70 squirrel hibernation burrows along the bank of the lower Kolyma river in northeast Siberia led to thousands of seed samples from various plants. The burrows were found at a depth of 20 to 40 meters, which contained remains of large mammals such as mammoths.

Scientists were able to regrow new specimens from old plant material because the burrows were quickly covered with ice, and have remained continually frozen ever since, which prevented any permafrost degradation.

That record has now been smashed. Scientists have successfully revived microbes that had lain dormant at the bottom of the sea since the age of the dinosaurs, allowing the organisms to eat and even multiply after eons in the deep. A team led by the Japan Agency for Marine-Earth Science and Technology analyzed ancient sediment samples deposited more than 100 million years ago on the seabed of the South Pacific.

The region is renowned for having far fewer nutrients in its sediment than normal, making it a far-from-ideal site to maintain life over millennia. The team incubated the samples to help coax the microbes out of their epoch-spanning slumber. Astonishingly, they were able to revive nearly all of the microorganisms.

University of Rhode Island Graduate School of Oceanography professor and study co-author Steven D'Hondt said the microbes came from the oldest sediment drilled from the seabed. Lead author Yuki Morono explained that



oxygen traces in the sediment allowed the microbes to stay alive for millions of years while expending virtually no energy.

Energy levels for seabed microbes "are million of times lower than that of surface microbes," he said. Such levels would be far too low to sustain the surface microbes, and Morono said it was a mystery how the seabed organisms had managed to survive. Previous studies have shown how bacteria can live on some of the least hospitable places on Earth, including around undersea vents that are devoid of oxygen.

***Editor's Note**: MAGS Rockhound News thanks Linda McCall, President, North Carolina Fossil Club, for passing along the information about the microbes.*

***Ref**:*

1. Bengt Oxelman et al, The taxonomic identity of the 30,000-y-old plant regenerated from fruit tissue buried in Siberian permafrost, Proc Natl Acad Sci USA October 9, 2012 109 (410 e2735; https://doi.org/10.1073/pnas.1207774109

2. Morono, Y., Ito, M., Hoshino, T. et al. Aerobic microbial life persists in oxic marine sediment as old as 101.5 million years. Nat Commun 11, 3626 (2020). https://doi.org/10.1038/s41467-020-17330-1

Yellowstone Supervolcano

Matthew Lybanon, Editor

The term "supervolcano" implies a volcanic center that has erupted more than 1,000 cubic km of material. So much magma is erupted that a circular-shaped collapse feature, called a caldera, forms above the evacuated magma storage region.

The best-known supervolcano in the U. S. is the Yellowstone supervolcano. The Yellowstone supervolcano has erupted at least 10 times over the past 16 million years. In a recent study, researchers found that volcanic deposits previously attributed to a series of small eruptions actually resulted from two huge ones.

The oldest, the McMullen Creek supereruption, occurred about 9 million years ago. The second, the Grey's Landing supereruption, occurred 8.72 million years ago and was the single largest eruption of the Yellowstone hotspot ever detected.

Six recorded supereruptions occurred during the Miocene epoch, 23 million–5.3 million years ago. These eruptions occurred, on average, every 500,000 years. But the two supereruptions that occurred since then are separated by 1.5 million years.

Because the park has only experienced two similar events in over the past three million years, experts are concerned the hotpot is enduring 'a very significant decline.' The new findings suggest we may have up to 900,000 years before another eruption occurs on that scale.

MAGS At A Glance

August 2020

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15 MAGS Field Trip, Crow Creek, Arkansas
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Contact Charles Hill

Memphis Archaeological and Geological Society
2019 Littlemore Drive
Memphis, TN 38016